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MIXING OF GASEOUS CURRENTS IN THE HEATING CHANNELS OF COKE OVENS

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/Digest/

This article discusses the results of an investigation into the mixing of gaseous currents in the heating of furnace gases. Although this method of heating is considerably employed, it has not been studied sufficiently.

The investigation endeavored to clarify the general picture of the process governing the mixing of gases for the indicated heating method and to reveal the role of the basic parameters corresponding to the normal condition encountered in practical exploitation of a coke oven. The basic objects of the study were: (1) the mixing of a furnace gas with air according to vertical height of furnace for a given coking period (18 hr); and (2) the dynamics of mixing for various coking periods (24, 18, 14 hr) and for various consumptions of the gaseous components.

The results of actual experiments on an isothermal air model (vapor model) of a vertical coking column in the scale 1:5 afford the basis for a proposed general scheme governing the hydrodynamical process accompanying the burning of a gas in a vertical coke furnace.

It is concluded that an intensified turbulent mixing of gas and air occurs in the lower part of the column under ordinary conditions of heating -- but turbulent exchange weakens as the gaseous currents are "braked," expanded or diluted, and lightened -- and that the conditions governing the input of gaseous currents are

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especially critical; these conditions are approximately characterized in practice by various quantities of Reynolds numbers and, consequently, by various linear velocities. It is found that the most important factor is the actual design and construction of the gas-supply ducts and cross sections, it being noted that most presentday designs of coking ovens are defective because the currents are hindered by the sharp angles in the narrow input openings.

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